Documents for EPA-R6-2013-9526

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STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

BRAD HENRY
Governor

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June 6, 2007

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CUSTOMER SERVICE BRANCH

William D. Rech, President
Blackwell Zinc Co., Inc.
c/o Phelps Dodge Corp.
One North Central Ave.
Phoenix, AZ 85004

Re: Authorization to Discharge, Permit No. OK0044962
Blackwell Zinc Company, Inc. (Groundwater Treatment Plant), City of Blackwell, Kay Co.
Facility ID No. I-36000620

Dear Mr. Rech:

Your Oklahoma Pollutant Discharge Elimination System (OPDES) permit is enclosed. The draft permit which we previously sent you received no comments. The effective date and expiration date of the final permit appear on the cover page.

Blank Discharge Monitoring Report (DMR) forms are also enclosed, along with instructions for preparing and submitting them. These blank forms should be used for reporting purposes until such time as you receive your pre-printed DMR forms. Please note that until the facility is constructed and begins discharging, you must submit monthly DMRs reflecting "no discharge" (see Part II, Item G, of the permit).

Should you have any questions regarding the final permit, please contact the Industrial Permits Section at the letterhead address or telephone (405) 702-8100. Should you have any questions regarding compliance with the conditions of this permit, please contact the Industrial Enforcement Section at the same address and phone number.

Sincerely,

Edward Dihrberg, P.E., Manager
Industrial Permits Section
Water Quality Division

ED/KF/ab KH/DM/ST/WTC

Enclosure

c. Chouteau DEQ Office
Clyde Mason, DEQ Regional Director
Evelyn Rosborough (6WQ-CA)
Joseph M. Flynn, EMC² Inc.

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1 - Permit/CD
2 - AD & AO matl
3 - DMR's
4 - Vio. Surv. Log
5 - NCR
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7 - CRAS
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AUTHORIZATION TO DISCHARGE UNDER THE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Permit Number:	**OK0044962**
Facility ID No.:	**I-36000620**

In compliance with the provisions of the Clean Water Act (33 U.S.C. 125 et seq.), hereinafter called the "Act," and with the provisions of the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act) 27A O.S. §2-6-201 et seq., and the rules of the Oklahoma Department of Environmental Quality promulgated thereunder;

Blackwell Zinc Company, Inc
(Blackwell Zinc Groundwater Treatment Plant)
One North Central Ave.
Phoenix, AZ 85004

is authorized to discharge from a groundwater remediation/treatment facility, located:

At 300 E. Stevens, adjacent to the City of Blackwell's Wastewater Treatment Plant, in the SE¼, NE¼, SW¼, Sect 26, T27N, R1WIM, Kay County, Oklahoma

to receiving waters:

the Chikaskia River (WBID OK621100000010_10), in stream segment 621100 of the Upper Arkansas River Basin, from:

Outfall 001
Latitude N 36° 47' 15.5", Longitude W 97° 16' 21.5"
SW¼, NW¼, SE¼, Sect 26, T27N, R1WIM, Kay Co., Oklahoma;

Discharges shall be in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

Issuance of this permit in no way or in any respect affects the permittee's civil or criminal responsibility regarding disposal and/or discharges of wastewater, except with respect to the permittee's legal responsibility under the OPDES Act and Department Rules.

This permit shall become effective on July 1, 2007.

This permit and the authorization to discharge shall expire at midnight, on June 30, 2012.
This is to certify that the wastewater discharges set forth in this permit comply with the requirements of Oklahoma's Water Quality Standards, as amended, provided the permittee does not exceed the effluent limitations set forth in this permit.

Issued this 6th day of June, 2007.

For the Oklahoma Department of Environmental Quality,

Edward Dihrberg, P.E., Manager
Industrial Permits Section
Water Quality Division

Jon L. Craig, Director
Water Quality Division

PART I

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. OUTFALL 001

a. Limitations and monitoring requirements

During the period beginning the effective date, and lasting through the expiration date, the permittee is authorized to discharge from Outfall 001. The discharge consists of groundwater treated to remove metals, particularly cadmium and zinc, as sulfide precipitates. Such discharge shall be limited and monitored by the permittee as specified below:

Parameters	Discharge Limitations				
	Mass Loading (lb/day unless otherwise specified)		Concentration/Other Units (µg/L unless otherwise specified)		
	Monthly Avg	Daily Max	Daily Min	Monthly Avg	Daily Max
Flow (MGD) STORET: 50050	Report (MGD)	Report (MGD)	---	---	---
Cadmium, total STORET: 01027	---	---	---	50.5 [a]	60.1 [a]
Lead, total STORET: 01051	---	---	---	5.0 [a]	12.4 [a]
Zinc, total STORET: 01092	---	---	---	Report	Report
Benzene STORET: 32104	---	---	---	---	Report
Ethylbenzene STORET: 34371	---	---	---	---	Report
Toluene STORET: 34010	---	---	---	---	Report
Naphthalene STORET: 34696	---	---	---	---	Report
pH STORET: 00400	---	---	6.5 [a] std units	---	9.0 [a] std units

[a] Pursuant to a Federal Court Consent Decree, the permit limits must be met within 60 days of the date of the commencement of the discharge.

Parameters	Monitoring Requirements	
	Monitoring Frequency [a]	Sample Type
Flow (MGD)	Daily	Record
Cadmium, total	2/month	24 hr composite
Lead, total	2/month	24 hr composite
Zinc, total	2/month	24 hr composite
Benzene	1/month [b]	24 hr composite
Ethylbenzene	1/month [b]	24 hr composite
Toluene	1/month [b]	24 hr composite
Naphthalene	1/month [b]	24 hr composite
pH	2/month	Grab

[a] When discharging.
[b] For one year beginning three years after the effective date of the permit, or when the discharge commences, whichever is later.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of a visible sheen of oil or globules of oil or grease on or in the water. Oil and grease shall not be present in quantities that adhere to stream banks and coat bottoms of water courses.

Note: See Parts II and III for additional requirements.

b. Sampling Location

Samples taken in compliance with the monitoring requirements specified above for Outfall 001 shall be taken at the following location: at the sampling station at the treated water holding tank prior to discharge to the receiving stream (see Appendix for latitude/longitude and legal location).

SECTION B. BACKGROUND MONITORING REQUIREMENTS

None.

SECTION C. SCHEDULE OF COMPLIANCE

None.

SECTION D. REPORTING OF MONITORING RESULTS

Monitoring results shall be reported in accordance with the provisions of Part III. Monitoring results obtained during the previous month shall be summarized and reported on the Discharge Monitoring Report (DMR) forms postmarked no later than the 15th day of the following month. If no discharge occurs during the reporting period, DMR forms stating "No Discharge" shall be submitted according to the above schedule.

The first report is due on August 15, 2007.

PART II
SPECIAL CONDITIONS

A. The permittee is hereby given notice that this permit is in all respects subject to compliance with and actions under any and all applicable and relevant terms, conditions, provisions and requirements and any and all amendments of the laws of the State of Oklahoma, the Department of Environmental Quality's Rules, and Oklahoma's Water Quality Standards. The absence of any express reference within this permit of any particular statutory requirement, rule(s), regulation(s), or standard(s) shall in no respect be deemed or construed to exempt or preclude the application of such requirement, rule(s), regulation(s), or standard(s) to this permit or the permittee. By the approval, grant and issuance of this permit, the permittee acknowledges receipt of true, correct and current copies of the Department of Environmental Quality's Rules, provided, however, that the permittee further acknowledges that any and all amendments thereto shall become part of this permit.

B. REOPENER CLAUSE

This permit may be reopened for modification or revocation and reissuance to require additional monitoring and/or effluent limitations where actual or potential exceedances of State water quality criteria are determined to be the result of the permittee's discharge to the receiving water(s), or a Total Maximum Daily Load is established for the receiving stream(s) or when required as technology. Modification or revocation and reissuance of the permit shall follow regulations listed at 40 CFR §124.5.

C. LABORATORY CERTIFICATION

Unless otherwise specified in this permit, all laboratory analyses for the parameters specified in this permit must be performed by a laboratory certified by the Oklahoma Department of Environmental Quality for those parameters.

D. ANALYTICAL REQUIREMENTS

Unless otherwise specified in this permit, effluent and/or upstream monitoring shall be conducted according to analytical, apparatus and materials, sample collection, preservation, handling, etc., procedures listed at 40 CFR Part 136 in effect on the effective date of this permit. Appendices A, B, and C to 40 CFR Part 136 are specifically referenced as part of this requirement. Amendments to 40 CFR Part 136 promulgated after the effective date of this permit shall supersede these requirements as applicable.

E. MINIMUM QUANTIFICATION LEVEL (MQL)

Detection limits for the following pollutants must be less than or equal to the MQL shown below. If any individual analytical test result for a pollutant is unmeasurable (i.e., non-detect) at a quantitation limit less than or equal to the MQL, a value of zero (0) may be used for that individual result for DMR calculations and reporting requirements, provided the detection limit for such analysis is reflected in the Comments section of the DMR.

POLLUTANT	MQL (µg/l)
Cadmium, total	1
Lead, total	5
Zinc, total	20
Benzene	10
Ethylbenzene	10
Toluene	10
Naphthalene	10

The permittee may develop an effluent and/or upstream specific method detection limit (MDL) in accordance with Appendix B to 40 CFR Part 136. For any pollutant for which the permittee determines an effluent and/or upstream specific MDL, the permittee shall send to DEQ, Water Quality Division, PDES Permitting Section, a report containing QA/QC documentation, analytical results, and calculations necessary to demonstrate that the effluent and/or upstream specific MDL was correctly calculated. An effluent and/or upstream specific minimum quantification level (MQL) shall be determined in accordance with the following calculation:

$$MQL = 3.3 \times MDL$$

Upon written approval by DEQ, the effluent and/or upstream specific MQL may be utilized by the permittee for all future DMR calculations and reporting requirements.

F. OTHER DISPOSAL METHODS

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be managed and/or disposed of in accordance with appropriate federal, state and/or local requirements.

If any such industrial wastes are removed from the facility, the permittee shall keep accurate records, which include the following information:

- Name and address of company hauling waste.
- The type and amount of waste hauled.
- The final disposal site of waste hauled.

Upon request, the above records shall be made available to DEQ staff for review. No other disposal methods subject to DEQ rules are used for wastewater or sludge disposal at this facility.

G. The permittee shall notify the DEQ in writing within five (5) days of commencement of discharge from Outfall 001. The permittee may report "no discharge" on DMRs until such time.

H. PRIORITY POLLUTANT ANALYSIS

In accordance with 40 CFR §122.21(k)(5)(vi), the permittee must submit a full priority pollutant analysis of the treatment plant effluent by no later than two years after commencement of the discharge.

APPENDIX

Sampling Locations

Outfall	Legal Location	Latitude	Longitude
001	SW¼, NW¼, SE¼, Sect 26, T27N, R1WIM, Kay Co., Oklahoma	N 36° 47' 15.5"	W 97° 16' 21.5"

STATEMENT OF BASIS
(Draft of 12/15/06)

FOR THE DRAFT AUTHORIZATION TO DISCHARGE TO WATERS OF THE UNITED STATES UNDER THE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM (OPDES).

Permit Number:	OK0044962
Facility ID Number:	I-36000620
Applicant:	Blackwell Zinc Company, Inc (Blackwell Zinc Groundwater Treatment Plant) One North Central Ave. Phoenix, AZ 85004
Issuing Office:	Oklahoma Department of Environmental Quality Water Quality Division 707 N. Robinson P.O. Box 1677 Oklahoma City, OK 73101-1677
Prepared By:	Kendra Foyil, P.E. Industrial Permits Section Water Quality Division
Reviewed By:	Edward Dihrberg, P.E., Manager Industrial Permits Section Water Quality Division

In accordance with 40 §§ CFR 124.8 and 124.56, this fact sheet describes the applicant's facility operation and sets forth the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit. Also set forth are any calculations or other necessary explanations of the derivation of specific effluent limitations and conditions, including citations to applicable effluent limitation guidelines or performance standards as required by 40 § CFR 122.44. In accordance with 40 CFR § 122.44(l), proposed permit limits for reissued permits are based on the more stringent of applicable technology-based limitations, applicable water quality-based limitations or limitations in the previous permit.

Citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations. Citations to OAC 252 and OAC 785 refer to promulgated regulations listed at Titles 252 and 785, Oklahoma Administrative Code.

I. PERMITTING BACKGROUND

A. CHRONOLOGY OF PERMITTING ACTIVITIES

The following is a chronology of permitting activities since issuance of the previous NPDES permit.

October 16, 2006:	Received additional information from applicant.
October 3, 2006:	Requested additional information from applicant on projected plant performance and cadmium loadings to address 303(d) issues.
September 28, 2006:	Meeting between applicant and DEQ to further discuss 303(d) issues.
September 15, 2006:	Received courtesy review comments from applicant.
August 23, 2006:	Meeting between applicant and DEQ to discuss 303(d) issues.
July 12, 2006:	Draft permit package for resited facility sent to applicant for courtesy review and to US Fish and Wildlife Service for review.
April 28, 2006:	Permit application for resited facility determined administratively complete.
March 13, 2006:	New application (Forms 1, 2D and 2S) received for resited facility.
March 1, 2006:	Permit application withdrawn by DEQ pending submittal of new application for resited facility.
December 1, 2005:	Notified by applicant that the groundwater treatment plant was to be resited.
August 29, 2005:	Draft permit package sent to applicant for courtesy review.
April 29, 2005:	Permit application determined administratively complete.
March 30, 2005:	Received certification of publication of notice of permit application.
March 3, 2005:	OPDES permit application (Forms 1, 2D and 2S) received.

B. PROPOSED PERMITTING ACTION

It is proposed that Permit No. OK0044962 be issued for a five year term as a first-time permit in accordance with regulations promulgated at 40 CFR §122.46(a) and OAC 252:606-1-5(b).

II. APPLICANT ACTIVITY

A. DESCRIPTION AND LOCATION OF FACILITY

The permittee will operate a treatment/remediation facility to remove cadmium and zinc from groundwater contaminated by historical smelting operations in the Blackwell area. The facility will operate under SIC code 9511 (air and water resource management) and is located in the SE¼, NE¼, SW¼, Section 26, Township 27N, Range 1WIM, Kay County, Oklahoma, or at 300 E. Stevens, in the City of Blackwell, Oklahoma.

B. WASTEWATER GENERATION AND TREATMENT

The facility will generate no process wastewater as such. It will use a chemically-based sulfide precipitation system, followed by settling and filtration, to remove cadium and zinc from the groundwater prior to discharge of the treated groundwater directly to the Chicaskia River immediately northeast of the City of Blackwell's wastewater treatment plant (WWTP). The dewatered metal sulfide solids resulting from the treatment process will be recycled to others for resource recovery.

III. DISCHARGE INFORMATION

A. DISCHARGE LOCATION

Outfall to Surface Waters

Outfall		Location				Receiving Stream
		General Location	Legal Description	Latitude	Longitude	
001	Sampling point	Sampler from the treated water holding tank at the treatment facility	SE¼, NE¼, SW¼, Section 26, Township 27N, Range 1WIM, Kay County, Oklahoma	N 36° 47' 9.6" (1927 NAD)	W 97° 16' 30" (1927 NAD)	---
	Point of actual discharge	Immediately northeast of Blackwell WWTP and upstream of the Blackwell WWTP's permitted discharge	SW¼, NW¼, SE¼, Section 26, Township 27N, Range 1WIM, Kay County, Oklahoma	N 36° 47' 15.5" (1927 NAD)	W 97° 16' 21.5" (1927 NAD)	Chikaskia River

B. DISCHARGE DESCRIPTION AND CHARACTERISTICS

Since this is a new facility, there is no historical effluent flow or pollutant concentration data to examine. All evaluation will be based on projected flows and pollutant levels in the discharge from the groundwater remediation unit (GRU).

1. Effluent Flow Rates

The permittee projects the throughput for the groundwater treatment plant to be approximately 120 gpm (0.1728 mgd) on average. The peak effluent flow, according to the application, was estimated to be approximately 300 gpm (0.432 mgd). For initial permitting purposes, the long term average and high 30-day average flows will be set equal to these two values. Part II of the permit contains a reopener clause which allows the permit to be reopened and limits added if there is any indication that pollutants present in the facility's discharge are exceeding water quality criteria. Otherwise, effluent flows will be reevaluated based on historical data when the permit is next due for reissuance.

2. Conventional and Non-conventional Pollutants

The application indicates that no conventional or non-conventional pollutants should be present at significant levels in the discharge from the GRU given the treatment process to be used.

3. Priority Pollutants

Data for priority pollutants present in the groundwater being remediated indicate that cadmium and zinc are present at significant levels. Low levels of BTEX and naphthalene have also been detected on occasion from certain groundwater monitoring wells in the groundwater study area and warrant short term monitoring at Outfall 001 to determine whether further consideration of these pollutants is warranted in the next permit cycle. Although lead was not detected in the groundwater study area, the detection limits used were higher than the established minimum quantification level (MQL) and, since lead is a cause of impairment for the Chikaskia River downstream from the Outfall 001 discharge, lead is a pollutant of concern. The permit application estimates maximum effluent levels of total cadmium and total zinc to be

4.2 µg/l and 435 µg/l, respectively, during the early period of operation of the facility. The treatment process should also remove lead, if in fact it is present in the groundwater.

IV. TECHNOLOGY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

A. GENERAL

Regulations promulgated at 40 CFR §122.44(a) require technology-based effluent limitations to be placed in NPDES permits (OPDES permits in the State of Oklahoma) based on effluent limitation guidelines where applicable, on Best Professional Judgment (BPJ) of the permit writer in the absence of guidelines, or on a combination of the two.

B. APPLICABLE EFFLUENT LIMITATION GUIDELINES (ELGs)

None applicable.

C. BEST PROFESSIONAL JUDGMENT (BPJ)-BASED LIMITATIONS

Since water quality criteria exist for the above-cited pollutants of concern, no technology/BPJ-based limitations for them are warranted at this time. Significant levels of biochemical oxygen demand (BOD) and total suspended solids (TSS) are not expected in the effluent from Outfall 001. Thus, monitoring and reporting of these characteristics will not be required.

D. VARIANCES

Not applicable.

V. WATER QUALITY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

A. GENERAL

Section 101 of the Clean Water Act (CWA) states that "... it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited..." A permit containing technology-based permit limitations alone may not adequately protect the quality of a specific receiving stream. Thus, additional water quality-based effluent limitations and/or conditions are considered in the draft permit using narrative and numerical standards contained in the Oklahoma Water Quality Standards (OWQS), as amended (OAC 785:45), and implementation criteria contained in OACs 785:46 and 252:690, promugated by the Oklahoma Water Resources Board (OWRB) and Department of Environmental Quality (DEQ), respectively. This is to ensure that no point-source discharge results in instream aquatic toxicity, a violation of applicable narrative or numerical State water quality standards, or aquatic bioaccumulation which threatens human health.

B. RECEIVING STREAM DESIGNATED USES AND ANTIDEGRADATION PROVISIONS

Outfall 001 will discharge directly to the Chicaskia River just northeast of the City of Blackwell's wastewater treatment plant (WWTP). Outfall 001's point of discharge is sufficiently far upstream of the Blackwell WWTP's point of discharge that they are not considered to have overlapping mixing zones.

The segment of the Chikaskia River (Waterbody ID OK621100000010_10 in segment 621100 of the Upper Arkansas River Basin) into which the facility will discharge is listed in Appendix A of the OWQS, and its designated uses are:

- Public and Private Water Supply (OAC 785:45-5-10);
- Fish and Wildlife Propagation/Warm Water Aquatic Community (OAC 785:45-5-12);
- Agriculture (OAC 785:45-5-13);
- Industrial and Municipal Process and Cooling Water (OAC 785:45-5-15);
- Primary Body Contact Recreation (OAC 785:45-5-16);
- Aesthetics (OAC 785:45-5-19); and
- Fish Consumption (OAC 785:45-5-20).

4. Antidegradation Provisions

The Chikaskia River is not designated as an outstanding resource water (ORW), high quality water (HQW) or senstive water supply (SWS) in Appendix A of the OWQS. Neither is it designated in Table 1 of Appendix B of the OWQS as an area of ecological and/or recreational significance or in Table 2 of Appendix B as an area containing federally-listed endangered species.

C. WATER QUALITY STANDARDS IMPLEMENTATION

1. Water Quality Standards Implementation Process

To achieve the objectives stated in Section V.A above, each pollutant present at measurable levels in the facility's effluent or which has technology-based concentration limitations, for which there is one or more applicable numerical water quality criteria, is screened against the applicable numerical criteria to determine whether the pollutant has reasonable potential (RP) to exceed any of the criteria. The screens are performed in accordance with the OWQS and OWQS implementation criteria in OAC 785:46, OAC 252:690 and the Continuing Planning Process (CPP) document. In the RP screening process, the 95th percentile effluent concentration, or estimate thereof if the effluent data set is not sufficiently large to determine it directly, is used to compute an instream concentration according to regulatory mixing zone equations defined in OAC 785:46. Calculated instream concentrations are then compared with applicable criteria to determine whether RP is exhibited for any of the screened pollutants. If RP is exhibited, in accordance with 40 CFR §122.44(d)(1)(vi) and OAC 252:690, a wasteload allocation and criterion long term average is computed for each applicable water quality criterion. Water quality-based permit limitations are calculated for each pollutant exhibiting RP for all applicable criteria. The most stringent of the resulting monthly average permit limitations is established in the draft permit for each pollutant requiring such limitations.

Since there are no historical performance data for the facility as yet, the RP screens reflected below are based on projected performance of the treatment process.

2. Summary of Regulatory Parameters

Regulatory receiving water flows are established in OAC 785:46. Effluent regulatory flows, as well as regulatory effluent and background pollutant concentrations are established in OAC 252:690, Subchapter 3. Definitions and values for these terms are as follows:

a. Effluent and Upstream Receiving Water Regulatory Flows

$Q_{e(30)}$ High 30-day average effluent flow rate over the period of record (see also Section III.B.1).

$Q_{e(LTA)}$ Long term average effluent flow rate over the period of record (see also Section III.B.1).

$Q_{u(7Q2)}$ Upstream 7Q2 flow rate. This is the annual 7-day, 2-year low flow of the receiving stream. Where streamflow data is published in the USGS publication, Statistical Summary of Streamflow Records in Oklahoma Through 1999 (WRIR 02-4025), by R.L. Tortorelli, minor adjustments for known upstream or downstream perennial flows and/or withdrawals, as appropriate, may be utilized to estimate the 7Q2 for a specific location upstream or downstream of the USGS gaging station. If streamflow is intermittent, if USGS 7Q2 data is not available, or if the applicant has not developed a site-specific 7Q2, a default value of 1 cfs (0.6463 mgd) is assumed.

$Q_{u(LTA)}$ Upstream long-term average flow rate. This is the mean annual flow of the receiving stream. Where streamflow data is published in the USGS publication, Statistical Summary of Streamflow Records in Oklahoma Through 1999 (WRIR 02-4025), by R.L. Tortorelli, minor adjustments for known upstream or downstream perennial flows and/or withdrawals, as appropriate, may be utilized to estimate the mean annual flow for a specific location upstream or downstream of the USGS gaging station. If published mean annual flow data is not available, it may be approximated by multiplying the receiving water's drainage area at the point of discharge by the mean annual runoff per unit area published in the CPP.

$Q_{u(STA)}$ Upstream short-term average flow rate. This flow rate, used only in the sample standard (SS) agriculture screen, is a function of $Q_{u(LTA)}$. The equation is $Q_{u(STA)} = 0.68 \times Q_{u(LTA)}$.

Upstream flows in the Chikaskia River at Outfall 001 are established as shown in the following table.

Upstream Regulatory Flows (mgd)
Chickaskia River

Flowstream	$Q_{u(7Q2)}$	$Q_{u(LTA)}$	$Q_{u(STA)}$
Chikaskia River at USGS gaging station 07152000 (immediately downstream of State Hwy 11 and upstream of the point of discharge of the facility into the Chikaskia River)	9.307	373.561	254.021 [a]

[a] $Q_{u(STA)} = 0.68 \times Q_{u(LTA)}$.

b. Flow Dilution Ratios (Q*)

Q* Ratio of effluent flow to stream flow, also known as dilution capacity. The Q* ratios for industrial discharges, as well as their values, are defined in the following table.

Q* Values for Outfall 001

Q* Ratio	Corresponding Water Quality Screens	Implementation Reference	Q* Value
$Q_{e(30)}/Q_{u(7Q2)}$	Chronic Toxicity	OAC 252:690-3-53(a)(2)	0.04642
$Q_{e(30)}/Q_{u(LTA)}$	Raw Water Column	OAC 252:690-3-73(a)	0.00116
$Q_{e(LTA)}/Q_{u(LTA)}$	Human Health/Fish Flesh	OAC 252:690-3-66(a)	0.00116
	Human Health/Fish Flesh & Water	OAC 252:690-3-73(a)	0.00116
	Agriculture/Yearly Mean Std	OAC 252:690-3-81(a)(1)	0.00116
$Q_{e(30)}/Q_{u(STA)}$	Agriculture/Sample Std	OAC 252:690-3-81(b)(1)	0.00170

c. Characterization of Pollutant Effluent Concentrations

C_{95} The 95th percentile maximum likelihood effluent concentration for purposes of determining whether effluent limitations are required. The value of C_{95} is calculated by one of two methods, depending on the size of the effluent data set (i.e., number of data points), in accordance with OAC 252:690-3-8, as follows:

- If at least 10 data points are available, at least five of which are measurable, C_{95} is calculated directly from the effluent data set, assuming a log-normal distribution, according to the following equation:

$$C_{95} = EXP\left(\ln(x)_{avg} + 1.645 \times s_{\ln(x)}\right),$$

$$\text{where } \ln(x)_{avg} = \frac{\left(\sum_{i=1}^{N} \ln(x_i)\right)}{N} \text{ and } s_{\ln(x)} = \sqrt{\frac{N\sum_{i=1}^{N}\left(\ln(x_i)^2\right) - \left(\sum_{i=1}^{N} \ln(x_i)\right)^2}{N(N-1)}}.$$

In the above equations, "$\ln(x)_{avg}$" represents the arithmetic average of the set of log-transformed data points. The standard deviation of the set of log-transformed data points is expressed as "$s_{\ln(x)}$".

- If less than 10 effluent data points are available, C_{95} must be estimated from the mean effluent concentration, as follows:

$C_{95} = C_{mean} \times 2.135$, where C_{mean} is calculated as the geometric mean.

In accordance with OAC 252:690-3-5, if the geometric mean is not available or cannot be determined, the arithmetic mean (C_{avg}) may be used.

$C_{95(M)}$ 95th percentile maximum likelihood effluent concentration for purposes of determining whether additional effluent monitoring is required, calculated using the "TSD method." The TSD method is based on the methodology in Section 3.3.2 of Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-001.

$C_{95(M)}$ is calculated according to the following equation:

$$C_{95(M)} = C_{max} \times RPF_{95(M)}$$

$RPF_{95(M)}$ is calculated, assuming a log-normal distribution, according to the following equation:

$$RPF_{95(M)} = \frac{EXP\left(1.645\sqrt{\ln\left(1+CV^2\right)} - 0.5\ln\left(1+CV^2\right)\right)}{EXP\left(z_N\sqrt{\ln\left(1+CV^2\right)} - 0.5\ln\left(1+CV^2\right)\right)}$$

where z_N is the upper k^{th} percentile of the normal distribution, $k = 0.05^{1/N}$ (for the 95% confidence level), and a CV of 0.6 is assumed.

The values of z_N and the resulting value of $RPF_{95(M)}$ for values of N from 1 to 9 are shown in the following table.

N	1	2	3	4	5	6	7	8	9
z_N	-1.645	-0.760	-0.336	-0.068	0.124	0.272	0.390	0.489	0.574
$RPF_{95(M)}$	6.199	3.795	3.000	2.585	2.324	2.141	2.006	1.898	1.811

CV Relative variability of a data set (normally using log-transformed values unless there is reason not to assume a lognormal distribution). CV is defined as the standard deviation of a data set divided by its arithmetic average. Where at least 10 effluent data points are available, CV may be determined according to the following equation.

$$CV = \frac{s_{ln(x)}}{ln(x)_{avg}}$$, where a lognormal distribution is assumed, or

$$CV = \frac{s_x}{C_{avg}}$$, where a lognormal distribution is not assumed.

Where fewer than 10 data points are available, a default CV value of 0.6 is assumed.

Values of C_{mean}, C_{max}, C_{95}, $C_{95(M)}$ and CV are summarized for quantifiable pollutants with applicable water quality criteria for Outfall 001 in the following table.

C_{mean}, C_{max}, C_{95} $C_{95(M)}$ and CV Values for Pollutants of Concern – Outfall 001

Effluent Characteristic	Concentration (µg/l unless otherwise specified)				Calculated CV
	C_{mean}	C_{95}	C_{max}	$C_{95(M)}$	
Cadmium, total	4.2 [a]	4.2 [a]	N/A	N/A	N/A
Lead, total [b]	Not available	N/A	N/A	N/A	N/A
Zinc, total	435 [a]	435 [a]	N/A	N/A	N/A

[a] Average effluent values are applicant's conservative "target" effluent levels based on the treatment technology described in the application.

[b] Applicant did not detect lead in the groundwater samples analyzed. However, since the detection limit used was 200 µg/l, which is higher than the established minimum quantification level (MQL) of 5 µg/l, the presence of lead in the groundwater cannot be ruled out. Therefore, lead is assumed for permitting purposes to be present in the effluent. It is acknowledged that the treatment process will remove lead in addition to the other target metals as an insoluble sulfide precipitate, but because the Chikaskia River is impaired for lead (see 303(d) list discussion in Section VI.F.2), lead limitations will be required on that basis. Since there is no estimated post treatment level for lead, RP screens are not performed for that pollutant.

d. Pollutant Background Concentrations

C_b Upstream or background concentration of a pollutant. Specific data is used where available. Where such data is not available, and in streams where $Q_{u(7Q2)} = 0$ in the absence of known upstream toxicants, background concentrations are assumed to be zero. For the agriculture screens, C_u is computed using the segment average YMS and SS values for the receiving stream segment published in Appendix F to OAC 785:45 according to the following equation: $C_u = 2 \times YMS - SS$. Background levels are described in the following table.

Background Concentrations of Pollutants of Concern in the Effluent from Outfall 001

Pollutant	Background Conc (C_b) (µg/l unless otherwise specified)	Data Source
Cadmium, total	1.6	See note a
Lead, total	7.25	See note b
Zinc, total	23.3	See note a

[a] Site-specific data from monitoring station (furnished by applicant) approximately 2000 feet upstream of Outfall 001.

[b] Geometric mean of measured values representative of segment of Chikaskia River to which the facility will discharge from OWRB BUMP data.

e. Other Applicable Terminology

$C_{criterion}$ Numerical water quality criterion for a specific pollutant. For some pollutants, aquatic toxicity criteria are pH- or hardness-dependent. In such cases, in accordance with OAC 785:46-5-8, site-specific pH or hardness data, if available, may be used. If site-specific pH or hardness data is not available, the segment averaged pH or hardness from OAC 785:46, Appendix B, is used. Where a specific pollutant screen exhibits reasonable potential for the purpose of establishing permit limitations, $C_{criterion}$ is used to calculate the wasteload allocation (WLA). Criteria applicable to the discharges from this facility are as follows:

- Fish and wildlife propagation (F&WP) use
  - C_A: Acute toxicity criterion
  - C_C: Chronic toxicity criterion
- Fish consumption use
  - C_{FF}: Human health criterion for the consumption of fish flesh
- Public and private water supply (PPWS) use
  - C_{RAW}: Raw water column criterion
  - C_{FFW}: Human health criterion for the consumption of fish flesh and water
- Agriculture use
  - C_{YMS}: Yearly mean standard
  - C_{SS}: Sample standard

C_d Downstream concentration of a specific pollutant, according to the appropriate mixing equation.

D. WATER QUALITY-BASED REQUIREMENTS

1. Criteria for Protection of the Fish and Wildlife Propagation Use

a. DO and DO-Demanding Substances

OAC 785:45-5-12(f)(1) requires that where DO-demanding substances are present in an effluent at significant levels, a WLA, which may be generated either by desktop modeling or as part of a Total Maximum Daily Load (TMDL) study, must be established according to certain seasonal criteria dependent on the receiving water's aquatic community subcategory. There is no basis to suspect any significant level of DO-demanding substances in the discharge from Outfall 001.

b. pH

OAC 785:45-1-12(f)(3) states, "pH values shall be between 6.5 and 9.0 in waters designated for fish and wildlife propagation; unless pH values outside that range are due to natural conditions." Normally, this pH range is established as end-of-pipe limits.

c. Oil and Grease

OAC 785:45-5-12(f)(4) states, "All waters having the designated beneficial use of any subcategory of fish and wildlife propagation shall be maintained free of oil and grease to prevent a visible sheen of oil or globules of oil or grease on or in the water. Oil and grease shall not be present in quantities that adhere to stream banks and coat bottoms of water courses or which cause deleterious effects to the biota." The nature of the groundwater and the remediative treatment process is such that the discharge from this facility is not expected to contain any significant level of oil and grease.

d. Toxicity from Halogenated Oxidants

There is no basis to suspect the presence of halogenated oxidants in the discharge from Outfall 001.

e. Ammonia Toxicity

OAC 252:690-3-20 requires that toxicity-based ammonia limits be compared with technology-based and/or DO-based ammonia limits, where established, for facilities classified as major industrial dischargers. According to the application, neither ammonia nor nitrate is present in the source groundwater to any significant extent. Therefore, there is no basis to suspect the presence of significant levels of ammonia in the discharge from Outfall 001.

f. Whole Effluent Toxicity (WET)

The facility to be permitted is considered to be a minor discharger. Thus, WET testing is not warranted at this facility.

g. Temperature

There will be no addition of heat from artificial sources to the water discharged at Outfall 001.

2. Aquatic Toxicity, Human Health and Raw Water Column Criteria for Toxic Substances for Protection of the Fish and Wildlife Propagation, Fish Consumption and Public and Private Water Supply Uses

a. Criteria and Implementation

(1) Aquatic Toxicity– Fish and Wildlife Propagation Use

Acute and chronic aquatic toxicity numerical criteria are specified at OAC 785:45-5-12(f)(6)(G) and are implemented according to procedures in OAC 785:46, Subchapter 5, OAC. 252:690-3-51 through 3-57, and Chapter 3 of the CPP.

Aquatic toxicity numerical criteria are hardness-dependent for certain metals. The equations for calculating hardness-dependent criteria and the resulting acute and chronic criteria are shown in the following table. A site-specific background hardness value is available for the Chicaskia River at its confluence with the Ferguson Ave. tributary.

Hardness-dependent Aquatic Toxicity Criteria for Chikaskia River at Confluence with Ferguson Ave. Tributary

Effluent Characteristic	Acute Toxicity Criteria		Chronic Toxicity Criteria	
	Equation	Value (µg/l)	Equation	Value (µg/l) [a]
Cadmium, total	$C_{acute} = e^{(1.128\ (\ln\ (hardness)) - 1.6774)}$	112.41 [a]	$C_{chronic} = e^{(0.7852\ (\ln\ (hardness)) - 3.490)}$	2.62 [a]
Lead, total	$C_{acute} = e^{(1.273\ (\ln\ (hardness)) - 1.460)}$	318.03 [a]	$C_{chronic} = e^{(1.273\ (\ln\ (hardness)) - 4.705)}$	12.39 [a]
Zinc, total	$C_{acute} = e^{(0.8473\ (\ln\ (hardness)) + 0.8604)}$	289.28 [a]	$C_{chronic} = e^{(0.8473\ (\ln\ (hardness)) + 0.7614)}$	262.02 [a]

[a] Based on measured site-specific hardness of 291 mg/l.

(2) Protection of Human Health for Consumption of Fish Flesh – Fish Consumption Use

Criteria for the protection of human health for the consumption of fish flesh apply only to receiving waters not designated as habitat-limited aquatic communities. Additional human health/fish flesh criteria are recommended by EPA in the National Recommended Water Quality Criteria (NRWQC). NRWQC criteria are not binding upon individual states, however.

OWQS and NRWQC criteria for the protection of human health for the consumption of fish flesh are specified at OAC 785:45-5-20(b) and Publication No. EPA 822-Z-99-001, respectively, and are implemented according to the procedures in OAC 785:46, Subchapter 7, OAC 252:690-3-64 through 3-70, and Chapter 3 of the CPP.

(2) Protection of Raw Water Column and Human Health for Consumption of Fish Flesh and Water – Public and Private Water Supply Use

OWQS raw water column criteria and criteria for the protection of human health for the consumption of fish flesh and water are specified at OAC 785:45-5-10(1) and 785:45-5-10(6), respectively, and are implemented according to the procedures in OAC 785:46, Subchapter 7, OAC 252:690-3-71 through 3-77, and chapter 3 of the CPP. These criteria apply only to receiving waters specifically designated in OAC 785:45, Appendix A, for the Public and Private Water Supply (PPWS) use.

b. Determination of Reasonable Potential and Wasteload Allocation

(1) Reasonable Potential and WLA Equations

(a) Aquatic Toxicity– Fish and Wildlife Propagation Use

For determining whether there is reasonable potential to exceed acute toxicity numerical criteria for discharges to streams, OAC 785:46-5-3(b)(2) defines a pollutant's concentration at the edge of the acute regulatory mixing zone (C_d) as:

$$C_d = C_b + \frac{Q_{e(30)}}{64.63}(C_{95} - C_b)$$, where $Q_{e(30)}$ is expressed in mgd.

In order for the acute mixing zone equation to be mathematically well-behaved, i.e., for C_d to fall in the range between C_u and C_{95}, the value for $Q_{e(30)}$ used in the acute mixing equation is limited to a maximum value of 64.63 mgd, even if the actual $Q_{e(30)}$ exceeds 64.63 mgd.

Should a pollutant's acute toxicity screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion. For discharges to streams, the acute toxicity wasteload allocation is calculated in accordance with OAC 252:690-3-55(a)(1), as follows:

$$WLA_A = C_b + \frac{64.63}{Q_{e(30)}}(C_A - C_b)$$, where $Q_{e(30)}$ is expressed in mgd.

As with the reasonable potential equation, if the actual $Q_{e(30)}$ exceeds 64.63 mgd, a maximum value of 64.63 mgd is used in the acute WLA equation.

For determining whether there is reasonable potential to exceed chronic toxicity numerical criteria, OAC 785:46-5-3(b)(2) defines a pollutant's maximum concentration at the boundary of the chronic regulatory mixing zone (C_d) as:

$$C_d = C_u + 1.94\ Q^* \frac{(C_{95} - C_u)}{(1 + Q^*)}, \text{ for } Q^* \le 0.1823$$

$$C_d = C_u + \frac{(C_{95} - C_u)}{(6.17 - 15.51\ Q^*)}, \text{ for } 0.1823 < Q^* < 0.3333$$

$$C_d = C_{95}, \text{ for } Q^* \ge 0.3333$$

Should a pollutant's chronic toxicity screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion. For discharges to streams, the chronic toxicity wasteload allocation is calculated in accordance with OAC 252:690-3-55(a)(1), as follows:

$$WLA_C = C_u + \left(\frac{1 + Q^*}{1.94 Q^*}\right)(C_C - C_u), \text{ for } Q^* \le 0.1823$$

$$WLA_C = C_u + (6.17 - 15.51\ Q^*)(C_C - C_u), \text{ for } 0.1823 < Q^* < 0.3333$$

$$WLA_C = C_C, \text{ for } Q^* \ge 0.3333$$

(b) Protection of Human Health for Consumption of Fish Flesh – Fish Consumption Use

OAC 785:46-7-3(b)(2) defines the reasonable potential equation for a pollutant's instream concentration C_d after complete mixing as follows:

$$C_d = \frac{(C_{95} Q^* + C_b)}{(1 + Q^*)}$$

The human health/fish flesh wasteload allocation is calculated in accordance with OAC 252:690-3-68, as follows:

$$WLA_{FF} = C_{FF} + \frac{(C_{FF} - C_b)}{Q^*}$$

Should a pollutant's OWQS human health/fish flesh screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion.

In accordance with EPA Region 6 policy, pollutants are screened for reasonable potential to exceed NRWQC human health/fish flesh consumption criteria. If reasonable potential is exhibited for a pollutant and there is no applicable state water quality criterion of any kind for that pollutant, effluent monitoring of the pollutant is required for a limited period of time as a permit condition in lieu of establishing effluent limitations.

(c) Protection of Raw Water Column and Human Health for Consumption of Fish Flesh and Water – Public and Private Water Supply Use

OAC 785:46-7-3(b)(2) defines the reasonable potential equation for a pollutant's instream concentration C_d after complete mixing as follows:

$$C_d = \frac{(C_{95} Q^* + C_b)}{(1 + Q^*)}$$

Raw water column and human health/fish flesh and water wasteload allocations are calculated in accordance with OAC 252:690-3-75, as follows:

$WLA_{Raw} = C_{Raw} + \frac{(C_{Raw} - C_b)}{Q^*}$, for the raw water column criterion, and

$WLA_{FFW} = C_{FFW} + \frac{(C_{FFW} - C_b)}{Q^*}$, for the human health/fish flesh and water criterion.

(2) Results of Reasonable Potential Screening

(a) Aquatic Toxicity– Fish and Wildlife Propagation Use

Results of acute and chronic toxicity criteria screens for Outfall 001 are shown in the following table. Any required OWQS WLAs are also shown. Where water quality-based permit limitations are required, results are shown in **bold face**.

Results of Acute and Chronic Toxicity Criteria Screens for Chikaskia River
(concentrations in µg/l unless otherwise specified)

Effluent Characteristic	Acute Toxicity				Chronic Toxicity			
	C_d	C_A	$C_d > C_A$?	WLA_A	C_d	C_C	$C_d > C_C$?	WLA_C
Cadmium, total	1.65	112.41	No	See note a	2.23	2.62	No	See note a
Zinc, total	29.35	289.28	No	---	101.22	262.02	No	---

[a] Although no reasonable potential to exceed applicable cadmium water quality criteria was demonstrated, there are special 303(d) listing (impaired waterbody) considerations which will require water quality-based limitations for cadmium (see Section V.F.2).

(b) Protection of Human Health for Consumption of Fish Flesh – Fish Consumption Use

Results of human health/fish flesh consumption criteria screens for Outfall 001, both those for which OWQS criteria exist and those for which only NRWQC criteria are published, are shown in the following table. Any required OWQS WLAs are also shown. Where water quality-based permit limitations are required, results are shown in **bold face**.

Results of Human Health/Fish Flesh Consumption Screens for Chikaskia River
(concentrations in µg/l unless otherwise specified)

Effluent Characteristic	OWQS Criteria				NRWQC criteria only		
	C_d	C_{FF}	$C_d > C_{FF}$?	WLA_{FF}	C_d	C_{FF}	$C_d > C_{FF}$?
Cadmium, total	1.61	84.13	No	---	---	---	See note a

[a] Although no reasonable potential to exceed applicable cadmium water quality criteria was demonstrated, there are special 303(d) listing (impaired waterbody) considerations which will require water quality-based limitations for cadmium (see Section V.F.2).

(c) Protection of Raw Water Column and Human Health for Consumption of Fish Flesh and Water – Public and Private Water Supply Use

Results of human health/fish flesh and water consumption and raw water column criteria screens for Outfall 001 are shown in the following table. Any required OWQS WLAs are also shown. Where water quality-based permit limitations are required, results are shown in **bold face**.

Results of Raw Water Column and Human Health/Fish Flesh and Water Consumption Screens for Chikaskia River
(concentrations in µg/l unless otherwise specified)

Effluent Characteristic	Raw Water Column Criteria				Human Health/Fish Flesh and Water Criteria			
	C_d	C_{Raw}	$C_d > C_{Raw}$?	WLA_{Raw}	C_d	C_{FFW}	$C_d > C_{FFW}$?	WLA_{FFW}
Cadmium, total	1.61	20	No	See note a	1.61	14.49	No	See note a
Zinc, total	24.35	5000	No	---	---	---	---	---

[a] Although no reasonable potential to exceed applicable cadmium water quality criteria was demonstrated, there are special 303(d) listing (impaired waterbody) considerations which will require water quality-based limitations for cadmium (see Section V.F.2).

c. Criterion Long Term Average (LTA) Concentrations and Permit Limitations

Zinc did not demonstrate a reasonable potential for the design target effluent concentration to exceed applicable criteria for the Chikaskia River. Thus, no permit limitations are necessary for zinc. However, as described in the footnotes to the tables in the preceding section, cadmium limitations will be required based on soon-to-be approved 303(d) list considerations, which are described in Section V.F.2 below. 303(d) list-based limitations for lead will also be required based on the currently approved 303(d) list.

3. Mineral Constituent Criteria for Protection of the Agriculture Use

Since the treatment process is not expected to add to the mineral constituents in the groundwater being treated, no RP screening for mineral constituents of agricultural significance was felt to be warranted.

4. Bacterial Criteria for Protection of the Primary and Secondary Body Contact Recreation Uses and the Public and Private Water Supply Use

Because the facility has no sanitary waste component to its discharge at Outfall 001, no permitting action is necessary to protect these uses from a bacteriological perspective.

5. Criteria for Protection of the Aesthetics Use

No pollutants of signifance which would affect the aesthetics use are expected to be present in the treated groundwater.

E. MONITORING REQUIREMENTS

1. Effluent Monitoring Requirements

Since the treatment facility is not yet in operation, and because effluent monitoring of cadmium and zinc will be required for the purpose of monitoring the performance of the treatment facility, it is unnecessary to perform RP screens using the methodology in Technical Support Document for Water Quality-Based Toxics Control (TSD method) on projected effluent quality at this time for the purpose of determining whether monitoring would be warranted. As discussed in Section III.B.3, however, effluent monitoring of BTEX and naphthalene will be required for a period of one year beginning three years after the effective date of the permit. Additionally, in accordance with 40 CFR 122.21(h)(4)(iii), the facility will be required to submit a priority pollutant analysis of the plant's effluent by no later than two years after the effective date.

2. Background Monitoring Requirements Based on the Magnitude of Applicable Numerical Criteria

Since background data already exists for cadmium, lead and zinc for the Chikaskia River, further background monitoring during the term of the proposed permit is unwarranted.

F. 303(d) LIST

1. Water Quality Assessment and Causes of Impairment

The 2004 edition of the state's 303(d) list approved by EPA Region 6 finds that the segment of the Chikaskia River (WBID OK621100000010) into which Outfall 001 discharges via Outfall 001 is impaired, with the listed causes being pathogens, turbidity, lead and cadmium.

2. 303(d) List-Related Permitting Actions

Where causes of impairment are listed generically, i.e., as a class of pollutants rather than as a specific pollutant or pollutants, EPA Region 6 policy requires that the draft permit include monitoring and reporting requirements for constituent pollutants in each listed class of pollutants as well as a reopener clause to incorporate the results of the approved TMDL as permit conditions. The data collected as a result of this requirement would then be used to support TMDL development. A projected TMDL date for this segment of the Chikaskia River has not yet been established. As described below, the GRU will reduce the cadmium level in the river and a TMDL for cadmium, if one is actually necessary, would be better served after knowing what the long term trend for instream cadmium levels will be as a result of the GRU's operation.

Pathogens: Since the facility will not discharge any sanitary waste, no pathogens are expected to be present in the discharge from Outfall 001.

Turbidity: No solids of a level significant enough to materially contribute to turbidity are expected to be present in the discharge from Outfall 001.

Lead: While the groundwater remediation treatment process should remove any lead present in the contaminated groundwater to a significant extent, in the best professional judgement of the permit writer, end-of-pipe limitations for lead equal to the most stringent applicable criteria are warranted to ensure that there is no contribution to continued impairment from the discharge of remediated groundwater pending completion of a TMDL for the waterbody. This requirement is implemented by setting the monthly average limit equal to the most stringent of the applicable long term average criteria (human health/fish flesh, human health/fish flesh and water, and raw water column) and setting the daily maximum limit equal to the more stringent of the applicable short term average criteria (acute and chronic aquatic toxicity). If the most stringent long term average criterion is higher than the more stringent short term average criterion, then both monthly average and daily maximum limitations are set equal to the more stringent short term average criterion. In this case, the monthly average lead concentration limit is set equal to the most stringent long term criterion (human health/fish flesh and water) of 5 µg/l, and the daily maximum concentration limit is set equal to the more stringent short term criterion (chronic aquatic toxicity) of 12.4 µg/l.

Cadmium: Cadmium will be present in the discharge of treated water from the GRU. Cadmium limitations in the draft permit must ensure that the facility does not further cause or contribute to impairment. Normally, EPA procedures for 303(d)-related permitting actions would require that criterion end-of-pipe limitations be established for new facilities discharging the pollutant of concern. However, EPA procedures do allow for "a limit, based on special considerations, such as reallocation of the wasteload, effluent trading, WQS variances or other options which are demonstrated not to cause or contribute to violation of the WQS."

Currently, there are three avenues by which cadmium reaches the Chikaskia River:

- Discharge from the Blackwell POTW, which is an artifact of sanitary sewer inflow and infiltration.
- Combined storm water and groundwater seepage discharge via the Ferguson Ave. tributary (primarily from storm drain along Lawrence Ave. at outfall SD-18) to the Chikaskia River.
- Generalized groundwater flow and discharge to the Chikaskia river from the Blackwell area (not part of the first two sources).

Even though the GRU will be discharging a small amount of cadmium back to the Chikaskia River (that which cannot be captured and removed by the treatment unit), it will be removing a much greater amount of cadmium from the groundwater. Consequently, there will over time be a sizeable reduction in the amount of cadmium reaching the Chikaskia River from all sources. The DEQ feels that this qualifies as a reasonable and compelling basis on which to grant limits based on special considerations.

The third source of cadmium described above (generalized groundwater flow into the Chikaskia River) can be considered negligible and inconsequential relative to the other two and likely will not be materially affected by the GRU. To assess the degree of reduction in cadmium loading to the Chikaskia River resulting from operation of the GRU, the removal of cadmium to the Chikaskia River from the first two sources (over the long term) must be compared to the additional loading to the Chikaskia River from the proposed GRU discharge. Information provided by the applicant has documented that essentially all the cadmium loading to the Chikaskia via the Ferguson Ave. tributary is derived from the day to day seepage into the Lawrence Ave storm drain, as monitored at SD-18. Thus, cadmium loadings at SD-18 are used to represent the contribution to the Chikaskia River from the Ferguson Ave. tributary.

Assessment of Cadmium Loadings in Chikaskia River

Cd loading removed by GRU groundwater drawdown and treatment (lb/day)		Cd loading added by GRU discharge (lb/day)
POTW discharge	Ferguson Ave. tributary discharge (SD-18)	
0.34 [a]	1.67 [b]	0.18 [c]

[a] Avg Cd loading based on POTW's Discharge Monitoring Reports (DMRs) for the period August 2003 – July 2006.
[b] Avg of loadings calculated from quarterly sampling and flow measurement at SD-18.
[c] Projected loading in GRU effluent calculated from projected long term avg flow (0.432 mgd) and a 95% probability basis effluent concentration (50.5 µg/l), as provided by the applicant's design engineers. This is a very conservative estimate of the effluent loading, and actual performance will likely result in much lower loadings. The associated 99% probability basis effluent cadmium concentration is 60.1 µg/l.

Thus, whereas the expected cadmium loading removed from the Chikaskia River is 0.34 + 1.67 = 2.01 lb/day, the estimate of the loading added back into the Chikaskia River by the GRU is 0.18 lb/day, amounting to a conservatively-estimated 91% overall reduction in cadmium loading in the river over the long term as a result of operation of the GRU. The DEQ considers this conservatively-estimated long term cadmiuim loading reduction in the Chikaskia River significant enough to form an acceptable basis for alternative cadmium limitations. Therefore, monthly average and daily maximum cadmium limitations of 50.5 and 60.1 µg/l, respectively, are established in the permit.

G. ANTIDEGRADATION REQUIREMENTS

As stated in Section V.B, no antidegradation restrictions are listed in Appendix A of the OWQS for the Chikaskia River. Implementation of the state's antidegradation policy, as described at OAC 785:46, Subchapter 13, requires no further protection beyond the Tier 1 level (maintenance and protection of designated uses, as herein described).

H. PROTECTION OF ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT

The locale in which the discharge from Outfall 001 is located is considered by the U.S. Fish and Wildlife Service (USFWS) to be a sensitive area for endangered or threatened species or their critical habitat. However, since the groundwater remediation project serves to remove metals from the subsurface that would otherwise migrate into the Chikaskia River over time, and additionally will reduce the background level of cadmium in the Chikaskia River over time, the impact of the project on endangered and threatened species and their critical habitat is seen as clearly beneficial to maintenance of endangered and threatened species and their critical habitat. Since this is a new permit, and in accordance with its MOU with the USFWS, the DEQ is affording the USFWS a 60 day period to review the draft permit and receiving stream environmental conditions prior to issuance of the permit.

I. 316(b) COOLING WATER INTAKE REQUIREMENTS

Not applicable.

VI. NON-DISCHARGE REQUIREMENTS

A. SURFACE IMPOUNDMENTS

Not applicable.

B. LAND APPLICATION

Not applicable.

C. SEPTIC SYSTEMS

Not applicable.

D. OTHER DISPOSAL METHODS

Sludge consisting of metal sulfides will be generated as an integral part of the treatment process. The sludge will be dewatered on-site and removed by others for purposes of resource recovery (metals reclamation). The following conditions have been included in Part II of the permit:

> Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a State approved industrial waste disposal site or to a company for recycling.

If any such industrial wastes are removed from the facility, the permittee shall keep accurate records, which include the following information:

- Name and address of company hauling waste.
- The type and amount of waste hauled.
- The final disposal site of waste hauled.

Upon request, the above records shall be made available to DEQ staff for review.

No other disposal methods subject to DEQ rules are used for wastewater or sludge disposal at this facility.

VII. DRAFT PERMIT EFFLUENT LIMITATIONS

A. GENERAL

In accordance with 40 CFR 122.44(a), (d) and (l), pollutant limitations and monitoring requirements are established in the draft permit based on the more stringent of technology-based, water quality-based or previous permit requirements. Both concentration and mass (loading) limits are established unless it is impractical to specify loading limits because of the units in which concentration limits are expressed (e.g., standard units for pH or degrees for temperature). Such loading limitations are calculated for each affected outfall using that outfall's high 30-day average effluent flow, $Q_{e(30)}$, over the period of record (see Section III.B.1) according to the following equation:

Mass loading limit *(in lb/day)* = Conc limit *(in mg/l)* × $Q_{e(30)}$ *(in MGD)* × 8.34, unless a more stringent loading limit from the previous permit applies.

B. OUTFALL 001

The following effluent limitations and monitoring requirements for Outfall 001 apply as shown in the tables below.

1. Limited Parameters

Given that the facility is not yet in operation and there is no historical flow record on which to base loading limitations, it is the BPJ of the permit writer that concentration limitations alone are sufficient to protect the quality of the receiving waters where limitations are required.

Mass Loading Limitations and Reporting Requirements – Outfall 001

Effluent Characteristic	Technology/BPJ Basis		Water Quality Stds Basis		Previous Permit Basis		Draft Permit	
	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max	Monthly Avg	Daily Max
Flow (mgd)	---	---	---	---	---	---	Report (mgd) [a]	Report (mgd) [a]

[a] Required by federal regulation at 40 CFR 122.44(i)(1)(ii).

Concentration Limitations and Reporting Requirements – Outfall 001

Effluent Characteristic [a]	Technology/BPJ Basis			Water Quality Stds Basis			Previous Permit Basis			Draft Permit		
	Daily Min	Monthly Avg	Daily Max	Daily Min	Monthly Avg	Daily Max	Daily Min	Monthly Avg	Daily Max	Daily Min	Monthly Avg	Daily Max
Cadmium, total	---	---	---	---	---	---	---	---	---	---	50.5 [b]	60.1 [b]
Lead, total	---	---	---	---	5.0	12.4	---	---	---	---	5.0 [c]	12.4 [c]
Zinc, total	---	Report	Report	---	---	---	---	---	---	---	Report [d]	Report [d]
Benzene	---	---	---	---	---	---				---	---	Report [e]
Ethylbenzene	---	---	---	---	---	---				---	---	Report [e]
Toluene	---	---	---	---	---	---				---	---	Report [e]
Naphthalene	---	---	---	---	---	---				---	---	Report [e]
pH (std units)	---	---	---	6.5	---	9.0	---	---	---	6.5	---	9.0

[a] Units are µg/l, unless otherwise specified.

[b] Cadmium limits are based on special considerations described in Section V.F.2. These limits will apply until such time as they may be adjusted or removed based on the results of an approved TMDL or approved site-specific cadmium toxicity criteria for the receiving segment of the Chikaskia River.

[c] Monthly average and daily maximum lead limitations are end-of-pipe limits set equal to the human health/fish flesh and water and the chronic toxicity criteria, respectively. These water quality-based lead limits will apply until such time as they may be adjusted or removed based on the results of an approved TMDL for the receiving segment of the Chikaskia River.

[d] Reporting requirement is BPJ based on the need to document facility performance.

[e] For one year beginning three years after the effective date of the permit.

2. Monitoring Frequencies and Sample Types

a. Evaluation for Performance-Based Monitoring Frequency Reductions

Not applicable, since this is the first time permit issuance.

b. Monitoring Requirements and Sample Types

Based on monitoring requirements in OAC 252:690-3-90 through 3-92, monitoring frequency and sample type requirements for Outfall 001 are as follows.

Monitoring Frequencies and Sample Types (Outfall 001)

Effluent Characteristic	Previous Permit		Draft Permit	
	Msmt Frequency	Sample Type	Msmt Frequency [a]	Sample Type
Flow	N/A	N/A	Daily	Record
Cadmium, total	N/A	N/A	2/month	24-hour composite
Lead, total	N/A	N/A	2/month	24-hour composite
Zinc, total	N/A	N/A	2/month	24-hour composite
Benzene	N/A	N/A	1/month [b]	24-hour composite
Ethylbenzene	N/A	N/A	1/month [b]	24-hour composite
Toluene	N/A	N/A	1/month [b]	24-hour composite
Naphthalene	N/A	N/A	1/month [b]	24-hour composite
pH (std units)	N/A	N/A	2/month	Grab

[a] When discharging.
[b] For one year beginning three years after the effective date of the permit.

C. BACKGROUND MONITORING

None.

D. COMPLIANCE SCHEDULE

None.

VIII. SUMMARY OF CHANGES FROM PREVIOUS PERMIT

Not applicable.

IX. ADMINISTRATIVE RECORD

The following sources were used to prepare the draft permit and constitute a part of its administrative record.

A. APPLICATIONS

- OPDES Permit Application No. OK0044962 (Forms 1 and 2D), received March 3, 2005, and revised permit application submitted March 13, 2006.

B. CLEAN WATER ACT CITATIONS

- Sections 301, 303(d), 316(b).

C. 40 CFR CITATIONS

- 40 CFRs 122, 124 and 136.

D. STATE LAW, STANDARDS, AND RULES AND REGULATIONS

- Oklahoma Pollutant Discharge Elimination System (OPDES) Act, 27A O.S. §2-6-201 *et seq*.
- OAC 785:45, Oklahoma Water Quality Standards (OWRB).
- OAC 785:46, OWQS Implementation (OWRB).
- OAC 252:606, Discharge Standards (DEQ).
- OAC 252:616, Industrial Wastewater Systems (DEQ).
- OAC 252:690, Water Quality Standards Implementation (DEQ).
- Oklahoma Continuing Planning Process (CPP) Document (DEQ).

E. MISCELLANEOUS

- 2004 303(d) list.
- Permit file, OPDES Permit No. OK0044962.
- USGS publication, Statistical Summary of Streamflow Records in Oklahoma Through 1999 (WRIR 02-4025), R.L. Tortorelli, 2002.

X. REVIEW BY OTHER AGENCIES AND FINAL DETERMINATION

A draft permit and public notice will be sent to the District Engineer, Corps of Engineers, and to the Field Supervisor of the U.S. Fish and Wildlife Service upon the publication of the notice. If comments are received from these agencies or other State or Federal agencies with jurisdiction over fish, wildlife, or public health, the permit may be denied or additional conditions may be included in accordance with regulations promulgated at 40 CFR 124.59. Since this is a new permit, and in accordance with its MOU with the USFWS, the DEQ is affording the USFWS a 60 day period to review the draft permit and receiving stream environmental conditions prior to issuance of the permit.

The public notice describes the procedures for the formulation of final determinations.